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(21) International Application Number: PCT/NL90/00184 (22) International Filing Date: 21 December 1990 (21.12.90) (30) Priority data: 8903177 29 December 1989 (29.12.89) NL (71) Applicant (for all designated States except US): AMAFIL- TER BV [NL/NL]; Kwakelkade 28, NL-1800 AJ Alkma- ar (NL). (72) Inventor; and (75) Inventor/Applicant (for US only) : DOSOUDIL, Martin [NL/NL]; Kwakelkade 28, NL-1800 AJ Alkmaar (NL). (74) Agent: KOOMEN, J.; Kennemerstraatweg 35, NL-1814 GB Alkmaar (NL).		(81) Designated States: AT (European patent), AU, BE (Euro- pean patent), CH (European patent), DE (European pa- tent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (Euro- pean patent), IT (European patent), JP, KP, KR, LU (European patent), NL (European patent), SE (Euro- pean patent), SU, US. Published <i>With international search report.</i> <i>In English translation (filed in Dutch).</i>
(54) Title: METHOD AND DEVICE FOR CARRYING OFF THE FILTER CAKE FROM A FILTER APPARATUS <div data-bbox="506 1100 1149 1747" data-label="Diagram"> </div>		
(57) Abstract Method and apparatus for the discharge of the filter cake out of a filter apparatus, whereby the filter cake is conveyed towards a discharge shaft to fall down into it, and whereby, when the cake reaches a certain height within the shaft, it is opened at or near its bottom end and the filter cake is pressed or blown out of the shaft by the over-pressure on the upper side of the cake.		

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Method and device for carrying off the filter cake from
a filter apparatus

The invention relates to a method and device for the
5 discharge of the filter cake, loosened from the filter
elements, out of the filter vessel of a filter apparatus,
more in particular out of a high pressure continuous
filter device.

10 Such a method and device is known, in which the loosened
filter cake is discharged from out the over-pressured
filter vessel by means of two conveyor screws, adjoining
each other under an angle of 90 degrees, and in which the
15 second conveyor screw which debouches out of the filter
vessel, along with the more or less compressed filter
cake has to form a closure between the inner-side and the
outer-side of the filter vessel being under pressure, so
that only the filter cake will be transported outside by
20 the second conveyor screw and no pressure-loss will occur
in the filter vessel itself.

This known method has the drawback that with certain
types of cake compositions the cake in the second
25 conveyor screw no longer is transported outside, but
starts to turn along with the conveyor screw.
Also in this known method and device, with certain types
of cake composition an inadmissibly high wearing of the

blades of the conveyor screws occurs, causing the necessity to replace them quickly and repeatedly.

The invention aims to obviate the drawbacks of the known method and apparatus for the discharge of the filter cake, loosened from the filter elements out of a filter vessel of a filter apparatus, more in particular out of a high pressure continuous filter apparatus.

10 The method according to the invention is characterized in that the filter cake is conveyed towards a discharge shaft, to fall down into it, and when the cake reaches a certain height within the shaft, the shaft is opened near or at the bottom end, and the filter cake is pushed or
15 blown out of the shaft by the over-pressure in the filter vessel.

By applying the method according to the invention, the filter cake is continuously conveyed out of the filter
20 vessel towards the discharge shaft, the shaft opens and closes periodically to periodically press or blow away the cake, collected within the shaft, out of the shaft.

The pressing or blowing away of the filter cake out of
25 the shaft may take place completely without any disturbances, and by the expansion of the gas or air, present within the space between the cake elements in the shaft during the pressing or blowing away of the cake from out of the shaft, causing the cake elements to be
30 loosened from each other and from the wall of the shaft in a favourable manner.

The filter cake loosened from the filter elements may be conveyed towards the discharge shaft in various ways.
35

According to a characteristic of the method according to the invention the filter cake is conveyed towards the

shaft by means of a conveyor screw.

During the pressing or blowing away of the cake from out of the shaft it is inevitable, that along with the cake a
5 part of the air- or gas-content of the filter vessel is discharged along with the filter cake to the outside and causing the occurrence of a certain pressure-loss within the filter vessel.

10 In order to reduce this pressure-loss to a minimum during the pressing or blowing away of the filter cake from out of the discharge shaft, the method according to the invention is further characterized in that the cake is sealed with a powder-shaped or viscous means, e.g. a
15 viscous oil, before the cake is pressed or blown away out of the shaft.

The sealing means may be put into the shaft in various ways.
20 Thus, the sealing means may be pressed into the shaft by means of a plunger.

The periodical opening and closing of the discharge of the shaft may take place in various ways.
25

In a favourable way according to a further characteristic of the method according to the invention, the opening and closing of the discharge of the shaft takes place automatically, and more in particular under
30 the control of one or more sensors, placed within the shaft.

Thus, a high level sensor may be present, which may be activated when the cake in the shaft reached a maximum
35 height, and a low level sensor, which is activated when the cake in the shaft drops down to or below this low level sensor.

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In a favourable embodiment of the invented method, when the cake in the shaft reaches a certain maximum height, the discharge is opened for a certain period of time.

- 5 This period of time for the opening of the discharge may efficiently be adjustable in dependance upon the nature of the cake to be removed from out of the shaft.

- 10 In a preferred embodiment of the invented method the opening time of the opening cyclus is increased or decreased with a certain time interval depending on either the not-reaching or the exceeding of a certain preferred minimum height of the cake within the shaft. Thus, in this embodiment of the invented method an
15 automatic adaptation to the nature of the cake to be discharged, occurs.

- In a favourable way in a further working out of the method according to the invention, the opening of the
20 discharge is controlled by a high level sensor and the increasing or decreasing of the opening time with the time interval is controlled by a low level sensor.

- Thus, in this embodiment of the invented method the
25 opening time may fluctuate around a certain average value and in the same way the height of the cake at the low level may fluctuate around a certain average minimum value.

- 30 In a further working out of the invented method, in order to prevent the cake from remaining hanging in the shaft, the outlet of the discharge is increased at a following opening cyclus, with, at the high level sensor remaining activated during a certain period of time.

- 35 The apparatus for applying the invented method consists of a filter apparatus more in particular a high pressure continuous filter apparatus, with a filter vessel

provided with conveyor means, more in particular a conveyor screw, by which the filter cake, loosened from the filter elements, may be discharged out of the filter vessel, the apparatus being characterized in that the
5 conveyor means connect onto a discharge shaft, which has been provided at or near its bottom end with a closing means, in such a way, that when the filter cake reaches a certain height within the discharge shaft, it is opened, and the cake is pressed or blown out of the shaft by the
10 over-pressure in the filter vessel.

In a favourable embodiment of the apparatus according to the invention the shaft extends widens conically towards the bottom end.

15 By this measure is achieved that the cake within the shaft is loosened from the shaft wall during the pressing or blowing away from out of the shaft, and the discharge of the cake from out of the shaft facilitated.

20 In a further embodiment of the invented apparatus, the shaft is provided with one or more sensors, such as electrodes, by which the height of the cake within the shaft may be determined and the closing means of the shaft may be controlled.

25 The electrodes may be positioned within the shaft at various heights in respect to one another, such, that when two electrodes which are positioned above one another both engage the filter cake, it causes an electrical closure between both the electrodes, and by
30 which, by means of a known controlling device, the closing means of the shaft may be opened temporarily for the discharge of the filter cake outside the filter apparatus.

35 For sealing the upper side of the cake, according to a last feature of the invented apparatus, the shaft is provided with one or more inlet openings, through which a

sealing means for sealing off the openings in the cake or the openings between between the cake elements, such as a viscous oil, may be applied onto the upper side of the cake before it will be pressed or blown away out of the shaft.

The invention will now be explained with reference to the drawing of an example of an embodiment.

As is shown in Fig. 1, by means of the conveyor screw 1, which extends towards a filter vessel which is not shown in the drawing, the filter cake loosened from the filter elements of the filter vessel is conveyed towards a discharge shaft 2, which at its bottom end is provided with a sluice 3, which is controllable by means of an hydraulic cylinder 4.

Within the shaft two scanning electrodes 5 and 6 are positioned, such that when the filter cake forms an electrical closure between both the electrodes by reaching a certain height within the shaft, the controlling device 7 shortly opens up the sluice 3, causing the filter cake to be pressed or blown away out of the shaft by the over-pressure in the filter vessel. Before the opening of the sluice a sealing means may be brought onto the filter cake within the shaft, to minimalise the pressure-loss within the filter vessel which occurs at the emptying of the shaft.

The injection of the sealing means through the inlet opening 8 may be controlled by a known controlling device 7.

C L A I M S.

1. Method for the discharge of filter cake loosened from the filter elements, from out of a filter vessel of a filter apparatus, more in particular a high pressure continuous filter apparatus, characterized in that the filter cake is conveyed towards a discharge shaft to fall down into it, and with the cake reaching a certain height within the shaft, this is being opened at or near its bottom end and the filter cake is pressed or blown out of the shaft by the over-pressure within the filter vessel.
2. Method according to claim 1, characterized in that the filter cake is conveyed towards the shaft by means of a conveyor screw.
3. Method according to claim 1 or 2, characterized in that before the pressing or blowing away of the filter cake from out of the shaft, it is sealed by applying a powder-shaped or viscous medium, such as a viscous oil.
4. Method according to claim 3, characterized in that the sealing means is pressed into the shaft by means of a plunger.
5. Method according to one of the preceding claims, characterized in that the opening and closing of the discharge of the shaft takes place automatically, more in

particular by the controlling of one or more sensors, positioned within the shaft.

5 6. Method according to one of the preceding claims, characterized in that the discharge when as the cake reaches a certain maximum height within the shaft, is opened for a certain period of time.

10 7. Method according to claim 6, characterized in that the opening time at the opening cyclus is increased or decreased with a fixed time interval in dependance upon the not-reaching, respectively the passing of a certain desired minimum height of the cake within the shaft.

15 8. Method according to claim 7, characterized in that the opening of the discharge takes place by the controlling of a high level sensor and the increasing or decreasing of the opening time with the time interval takes place by the controlling of a low level sensor.

20 9. Method according to one of the preceding claims, characterized in that the outlet of the discharge at the high level sensor remaining activated during a certain period of time, is increased at the following opening
25 cyclus.

30 10. Apparatus for the use of the method according to one or more of the preceding claims, comprising a high pressure continuous filter apparatus, with a filter vessel, provided with conveyor means, more in particular a conveyor screw, by means of which the filter cake loosened from the filter elements may be discharged from out of the filter vessel, characterized in that the
35 conveyor means connect onto a discharge shaft, which at or near its bottom end is provided with a closing means, in such a way, that when the filter cake reaches a certain height within the shaft, the shaft is opened near

9.

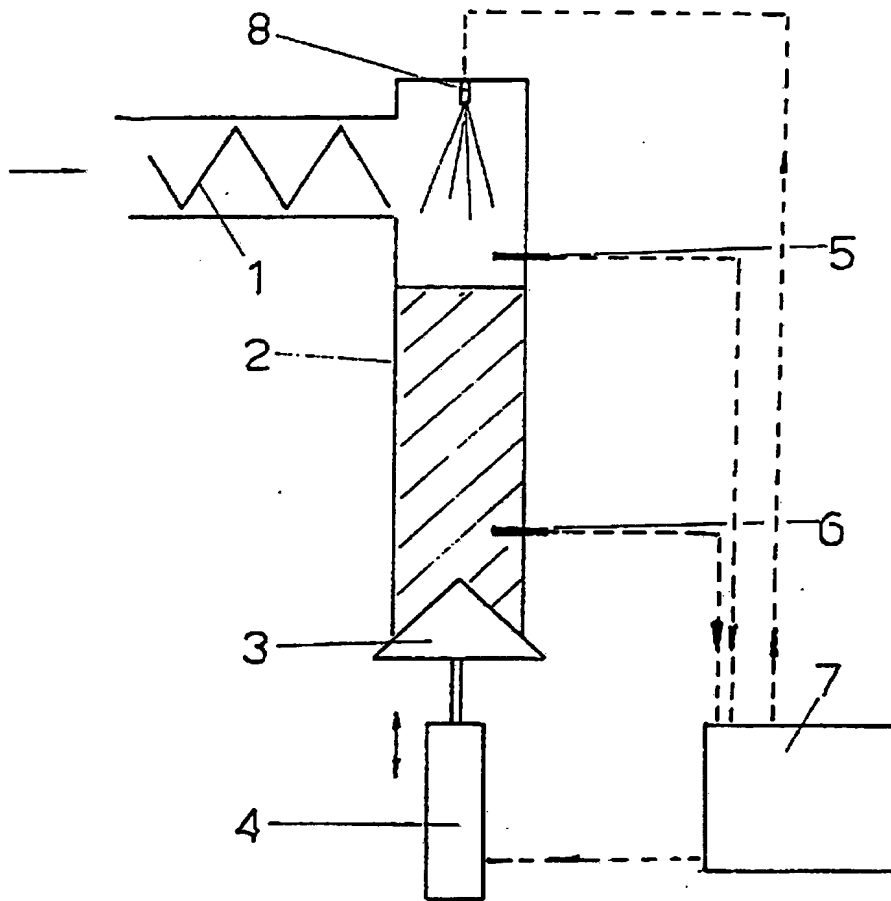
or at its bottom end and the cake is pressed or blown out of the shaft by the over-pressure within in the filter vessel.

5 11. Apparatus according to claim 6, characterized in that the shaft widens conically towards its bottom end.

10 12. Apparatus according to claim 6 or 7, characterized in that the shaft is provided with one or more sensors, such as electrodes, by means of which the height of the cake within the shaft may be determined and the closing means of the shaft may be controlled.

15 13. Apparatus according to one of the preceding claims, characterized in that the shaft is provided with one or more inlet openings, through which a sealing means such as a viscous oil, for sealing the openings in the cake or between cake elements, is put onto the upper side of the cake before it is pressed or blown away out of the shaft.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 90/00184

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all)⁶

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 B01D29/94 ; B01D29/60

II. FIELDS SEARCHED

Minimum Documentation Searched⁷

Classification System	Classification Symbols
Int.Cl. 5	B01D

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched⁸III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹

Category ⁹	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	NL,A,8005787 (AMAFILTER) 17 May 1982 see pages 1 - 7 ---	1-5, 10-13

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IV. CERTIFICATION

Date of the Actual Completion of the International Search

25 FEBRUARY 1991

Date of Mailing of this International Search Report

15. 03. 91

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ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
NL-A-8005787	17-05-82	None	

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